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Spin-lattice relaxation of polymers: The memory-function formalism

Fatkullin N., Kimmich R., Weber H.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

An alternative and general formalism for the frequency dependence of the spin-lattice relaxation time T1 of polymer liquids is derived on the basis of memory functions of polymer theories. As examples the original Rouse model [J. Chem. Phys. 21, 1272 (1953)] and the renormalized Rouse model by Schweizer [J. Chem. Phys. 91, 5802 (1989)] are considered. The results fit well the experimental data obtained for polydimethylsiloxane (PDMS) melts and solutions by the field-cycling technique. The Rouse model fits solutions and low-molecular-weight melts. The renormalized Rouse model explains the peculiar ν0.25 dispersion of the spin-lattice relaxation time observed with PDMS melts at molecular weights MwMc. © 1993 The American Physical Society.

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